A Turning Point for the Service Sector in Thailand

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ABSTRACT

Although Thailand's service sector accounts for almost half of the national income and has a major stake in national employment, its contribution to the growth of the gross domestic product (GDP) fluctuates. Moreover, the share of the service sector in GDP is decreasing while many developed countries maintain a positive association between the shares of the sector in output and per capita income. This paper investigates this relationship by examining the gross provincial product of 76 provinces to test the hypothesis that the service sector is a growth engine in the Thai economy. Using the fixed-effects model, the estimates confirm two waves of growth. Total factor productivity and revealed comparative advantages are discussed to determine significant service activities. Wholesale and retail trade, tourism and travel-related activities, transportation, and construction all play major roles in contributing to Thailand's economic growth. The government should continue to promote these services with unambiguous policies suitable for each region and province. Educational services also require more attention from pertinent agencies.

I. INTRODUCTION

As is true in every newly industrializing economy, the economy of Thailand is mixed. Decisions regarding the production of goods and services are made in both the private and public sectors. From the early 1970s to the mid-1990s, Thailand experienced significant economic growth. Between 1980 and 1990, the average growth of real gross domestic product (GDP) was about 7.6%, and the growth of exports was around 14%. Between 1990 and 1995, average growth in real GDP reached 8.4%, and average export growth was 14.2% (Salvatore 2011). Since 2000, however, Thailand has had an average real GDP growth of only about 4%. While Thailand is widely perceived as an economically developing country led by agricultural exports, the majority of the country's income is driven by the manufacturing and the service sectors. Since 1993, the agriculture sector has contributed only 300–400 billion baht (B) per year to Thailand's real GDP while in 2009, the service sector generated about B2 trillion or almost 50% of GDP mostly from private sector services (Table 1).

Based on this pattern, the Thai economy is in the first phase of economic development. After resources shift from agriculture to manufacturing, there will be a final shift to tertiary production or services (Fisher 1939, Clark 1940). This paper analyzes the status of Thailand's service sector and investigates whether it is a growth engine for the economy.

II. BASIC FACTS

Because the service sector is highly diverse, ranging from low-end services such as street vendors to high-end services in the financial and professional sectors, a clear definition is required.

A.   What is Thailand's Service Sector?

Like every country, Thailand has several definitions of services depending on derivation and terms of use. The National Economic and Social Development Board of Thailand defines the service sector as all economic activities except for those in the agriculture, manufacturing, and mining and quarrying sectors.[1] Using this broad concept, Thailand defines its service sector as comprising no fewer than a dozen economic activities. Since 1991, the General Agreement on Trade in Services (GATS) has offered a different definition of the service sector and has published a service sector classification list (WTO 1995) that has become the standard for academics and scholars. A third classification method is the balance of payments, an International Monetary Fund definition used mainly for international trade and finance statistics.

Because the National Economic and Social Development Board and GATS propose different definitions of the service sector, researchers and policymakers have a more difficult time studying service activities. For example, the national definition classifies hotels and restaurants as major service activities whereas the GATS recognizes each as services within tourism and travel (Table 2). Multiple definitions make data collection and systematic analysis difficult which in turn generates high transaction costs when researchers and policymakers need more information about particular services such as tourism or recreational services.

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[1]   This is the International Standard Industrial Classification of All Economic Activities (ISIC) for objectively classifying economic data.

Table 1: Gross Domestic Product in 1988 Prices by Economic Activity in Thailand, 1993–2009 (Baht million)

	1993–1997	1998–2002	2003	2004	2005	2006r	2007r	2008r	2009p
Agriculture	**274,652**	**304,785**	**363,033**	**354,431**	**347,892**	**365,428**	**369,772**	**385,225**	**390,362**
Agriculture, hunting and forestry	225,894	255,337	307,619	296,996	288,835	301,608	306,747	320,058	322,342
Fishing	48,758	49,449	55,414	57,435	59,057	63,820	63,025	65,167	68,020
Non-agriculture	**2,584,062**	**2,683,356**	**3,105,133**	**3,333,758**	**3,510,127**	**3,689,076**	**3,889,254**	**3,979,608**	**3,872,777**
Mining and quarrying	48,445	63,541	76,616	80,837	88,081	91,585	95,088	95,280	96,105
Manufacturing	930,871	1,071,093	1,318,279	1,426,338	1,499,882	1,588,105	1,686,372	1,751,411	1,645,015
Electricity, gas and water supply	75,894	97,317	115,195	122,525	129,004	135,114	141,975	147,603	148,880
Construction	169,805	81,541	82,837	88,790	93,809	98,086	100,511	95,190	95,551
Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods	491,047	465,085	493,719	517,310	541,934	560,218	591,030	596,735	594,785
Hotels and restaurants	104,068	112,647	118,852	133,324	136,165	151,267	157,858	160,430	160,017
Transport, storage and communications	238,223	291,245	340,644	366,290	383,925	407,682	432,037	429,933	413,666
Financial intermediation	198,424	98,949	111,807	125,723	136,342	140,719	148,575	160,938	167,346
Real estate, renting and business activities	108,986	120,278	134,641	143,581	151,225	159,500	164,607	168,739	170,597
Public administration and defense; compulsory social security	76,562	97,042	108,375	111,795	116,267	115,298	120,583	122,161	122,260
Education	65,223	83,246	86,760	89,821	96,138	99,343	109,095	109,423	115,190
Health and social work	30,715	41,481	42,689	43,678	48,515	50,938	54,680	54,263	55,346
Other community, social and personal service activities	42,408	56,483	71,168	80,066	85,155	87,619	83,148	83,740	84,186
Private households with employed persons	3,391	3,408	3,551	3,680	3,685	3,602	3,695	3,762	3,833
Gross domestic product (GDP)	**2,858,714**	**2,988,142**	**3,468,166**	**3,688,189**	**3,858,019**	**4,054,504**	**4,259,026**	**4,364,833**	**4,263,139**
Per capita GDP (Baht**)**	**48,121**	**47,938**	**54,205**	**57,154**	**59,264**	**61,831**	**64,491**	**65,654**	**63,721**
Service sector	**1,604,745**	**1,548,722**	**1,710,238**	**1,826,583**	**1,922,164**	**2,009,386**	**2,107,794**	**2,132,917**	**2,131,657**
Private service sector	**1,528,183**	**1,451,679**	**1,601,863**	**1,714,788**	**1,805,897**	**1,894,088**	**1,987,211**	**2,010,756**	**2,009,397**
Non-services	**1,253,969**	**1,439,420**	**1,757,928**	**1,861,606**	**1,935,855**	**2,045,118**	**2,151,232**	**2,231,916**	**2,131,482**

p = prediction, r = re-estimate.

Source: National Economic and Social Development Board

Table 2: Definitions of the Service Sector

Service Sector: NESDB Concept	Scope of Services: GATS Concept
1. Electricity, gas and water supply	1. Business services
2. Construction	2. Communication services
3. Wholesale and retail trade; repair of motor vehicles, motorcycles, and personal and household goods	3. Construction and related engineering services
4. Hotels and restaurants	4. Distribution services
5. Transport, storage and communications	5. Educational services
6. Financial intermediation	6. Environmental services
7. Real estate, renting, and business activities	7. Financial services
8. Public administration and defense; compulsory social security	8. Health-related and social services
9. Education	9. Tourism and travel-related services
10. Healthcare and social work	10. Recreational, cultural, and sporting services
11. Other community, social, and personal service activities	11. Transport services
12. Private households with employed persons	12. Other services not included elsewhere

GATS = General Agreement on Trade and Services, NESDB = National Economic and Social Development Board.

Source: Author's compilation from NESDB and GATS.

B.   Size, Growth, and Composition

The World Factbook records that in 2011 the Thai economy (measured by current GDP under the official exchange rate) was estimated at about $345.6 billion. Using the purchasing power parity method, Thailand's economy was estimated at about $601.4 billion which ranked it 25th among 226 countries. Thailand is an upper-middle income country, and its economy is comprised mainly of the agriculture, manufacturing, and service sectors which contributed approximately 13.3%, 34%, and 52.7%, respectively to the GDP (CIA 2012). Thailand's service sector has long been viewed as an indicator of economic development. Over the past few decades, the significance of the service and manufacturing sectors in terms of real GDP has increased steadily while the share of real GDP derived from the agriculture sector has become less important. Among the three major sectors, the service sector has contributed the largest percentage to the country's GDP since 1993 (Figure 1).

Figure 1: Sector Share in GDP
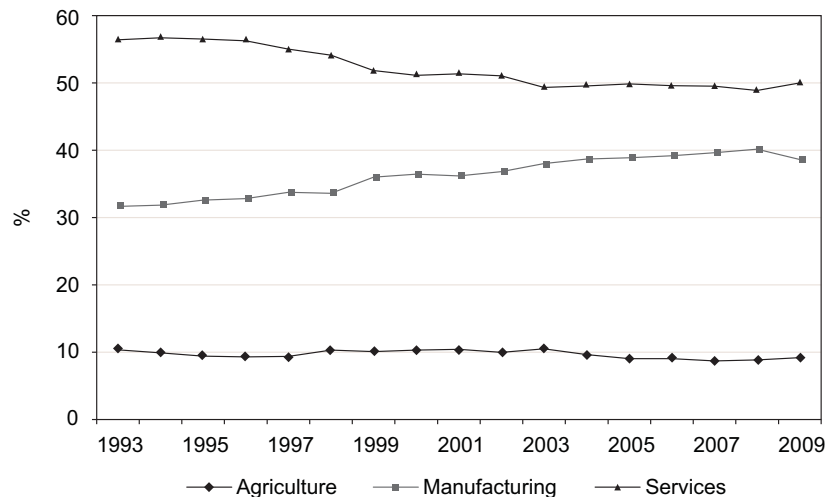
Source: Author's calculations using National Economic and Social Development Board data.

Thailand's service sector contributed from 0.6 percentage points to 3.4 percentage points to GDP growth from 1993 to 2009 except in 1998 to 2002 after the Asian financial crisis and again in 2009 while manufacturing contributed about 1.1 percentage points to 3.9 percentage points from 1993 to 2008 (Table 3). The agriculture sector has played a smaller role in growth and income as its share in GDP stabilized at around 10% during the study period contributing less than 0.5 percentage points to GDP growth. Although the service sector contributed substantially to GDP growth from 1993 to 2008, over time its share in GDP seemed to shrink while the opposite was true for the share of the manufacturing sector. Figure 1 illustrates these trends. This reflects the changing nature of the Thai economy. Diminishing agricultural production implies that to some extent the country has developed according to the structural change model of shifting from agriculture to manufacturing to services. Whether Thailand is currently at the secondary or tertiary stage is still unclear.

Like the share of the service sector in GDP, the share in employment has been paramount since 2003 and in 2010 provided work for about 18 million people (Table 4). The trends in the shares in GDP and in employment are, however, moving in opposite directions as the former is decreasing while the latter is increasing. In contrast, the labor force in the agriculture sector has fluctuated from 1998 to 2010 but since 2008 has shown signs of decreasing in both size and in share of employment. While the manufacturing sector, as noted previously has increased its share in GDP, its share in employment has remained stable at about 15%. The average wage paid in services has, however, been higher than the average wage paid in the other two sectors (Figure 2).

In order to evaluate the relative importance of individual services, the share of each service industry in sector output from 1993 to 2009 is plotted in Figure 3. The most outstanding service industry in terms of its contribution to GDP is wholesale and retail trade[2] which contributed as much as 14% of the total in 2009 or about 28% of the total service contribution. Transportation, storage, and communications ranked second contributing 9.7% of total GDP in 2009 or 19% of total service output. From an employment perspective, wholesale and retail trade was again the most significant, generating jobs for about 6 million people in 2009. Hotels and restaurants (2.7 million jobs); construction (2.4 million); public administration, defense, and social security (1.5 million); and education (1.2 million) were also important sources of employment. Wholesale and retail trade thus appears to be the most significant service in the Thai economy as it provided the largest contribution to the GDP and generated the most employment.[3]

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[2] Wholesale and retail trade includes repairing motor vehicles and motorcycles as well as personal and household goods.
[3] Street vendors and flea market merchants are becoming significant as the government promotes small and medium-sized enterprises and labor shifts from the agriculture sector to the service sector.

Table 3: Contribution to Growth of Gross Domestic Product at 1988 Prices by Economic Activity in Thailand, 1993–2009
(percentage points)

|	1993–1997	1998–2002	2003	2004	2005	2006r	2007r	2008r	2009p
Agriculture	**0.30**	**0.25**	**1.26**	**–0.25**	**–0.18**	**0.45**	**0.11**	**0.36**	**0.12**
Agriculture, hunting, and forestry	0.27	0.23	1.09	–0.31	–0.22	0.33	0.13	0.31	0.05
Fishing	0.03	0.01	0.17	0.06	0.04	0.12	–0.02	0.05	0.07
Non-agriculture	**5.39**	**0.99**	**5.88**	**6.59**	**4.78**	**4.64**	**4.94**	**2.12**	**–2.45**
Mining and quarrying	0.17	0.08	0.15	0.12	0.20	0.09	0.09	0.00	0.02
Manufacturing	2.35	1.12	3.94	3.12	1.99	2.29	2.42	1.53	–2.44
Electricity, gas, and water supply	0.22	0.16	0.16	0.21	0.18	0.16	0.17	0.13	0.03
Construction	0.03	–0.43	0.07	0.17	0.14	0.11	0.06	–0.12	0.01
Wholesale and retail trade; repair of motor vehicles, motorcycles, and personal and household goods	0.79	–0.18	0.43	0.68	0.67	0.47	0.76	0.13	–0.04
Hotels and restaurants	0.07	0.13	–0.16	0.42	0.08	0.39	0.16	0.06	–0.01
Transport, storage, and communications	0.80	0.36	0.29	0.74	0.48	0.62	0.60	–0.05	–0.37
Financial intermediation	0.29	–0.69	0.50	0.40	0.29	0.11	0.19	0.29	0.15
Real estate, renting, and business activities	0.17	0.08	0.19	0.26	0.21	0.21	0.13	0.10	0.04
Public administration and defense; compulsory social security	0.15	0.13	0.10	0.10	0.12	–0.03	0.13	0.04	0.00
Education	0.13	0.08	0.03	0.09	0.17	0.08	0.24	0.01	0.13
Healthcare and social work	0.07	0.06	-0.05	0.03	0.13	0.06	0.09	–0.01	0.02
Other community, social, and personal service activities	0.15	0.09	0.23	0.26	0.14	0.06	–0.11	0.01	0.01
Private households with employed persons	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gross domestic product (GDP)	**5.69**	**1.23**	**7.14**	**6.34**	**4.60**	**5.09**	**5.04**	**2.48**	**–2.33**
Service sector	**2.87**	**–0.21**	**1.79**	**3.35**	**2.59**	**2.26**	**2.43**	**0.59**	**–0.03**
Private service sector	**2.72**	**–0.35**	**1.69**	**3.26**	**2.47**	**2.29**	**2.30**	**0.55**	**–0.03**
Non-services	**2.82**	**1.45**	**5.35**	**2.99**	**2.01**	**2.83**	**2.62**	**1.89**	**–2.30**

p = prediction, r = re-estimate.

Source: Author's calculations using National Economic and Social Development Board data.

Table 4: Employment by Economic Activity in Thailand, 1998–2010
(1,000 persons)

|	1998–2002	2003	2004	2005	2006r	2007	2008	2009
Agriculture	**13,738.98**	**13,880.09**	**13,633.87**	**13,616.97**	**14,170.51**	**14,306.01**	**14,699.12**	**14,692.55**
Agriculture, hunting, and forestry	13,280.78	13,424.81	13,201.44	13,164.65	13,715.85	13,862.41	14,283.25	14,228.35
Fishing	458.20	455.28	432.43	452.33	454.66	443.60	415.87	464.20
Non-agriculture	**17,706.11**	**19,960.93**	**21,094.95**	**21,640.21**	**21,515.02**	**21,943.44**	**22,317.50**	**23,013.79**
Mining and quarrying	18.95	46.72	50.42	56.59	57.58	63.06	57.93	51.20
Manufacturing	4,633.45	5,298.72	5,476.14	5,587.89	5,504.13	5,619.23	5,453.27	5,373.91
Electricity, gas, and water supply	117.19	94.84	100.38	106.87	106.54	101.77	106.39	102.21
Construction	1,593.16	1,880.68	2,080.36	2,129.39	2,150.74	2,148.74	2,214.04	2,302.96
Wholesale and retail trade; repair of motor vehicles, motorcycles, and personal and household goods	4,482.47	5,199.18	5,540.31	5,553.27	5,513.60	5,574.40	5,754.28	6,047.63
Hotels and restaurants	1,835.18	2,147.24	2,255.89	2,348.53	2,274.67	2,342.96	2,384.25	2,592.91
Transport, storage, and communications	992.13	1,049.62	1,100.44	1,108.05	1,072.30	1,058.06	1,117.09	1,140.82
Financial intermediation	287.54	288.86	296.65	316.95	340.15	341.86	373.13	375.27
Real estate, renting, and business activities	472.98	557.42	623.84	647.35	672.39	717.33	731.51	744.10
Public administration and defense; compulsory social security	1,036.29	953.99	993.98	1,109.78	1,156.01	1,250.96	1,299.30	1,348.69
Education	945.65	973.01	1,031.41	1,044.25	1,043.65	1,045.93	1,061.56	1,132.67
Healthcare and social work	431.16	514.29	546.77	601.66	588.81	633.41	681.39	698.92
Other community, social, and personal service activities	579.94	682.04	724.96	736.87	744.05	750.33	825.65	837.60
Private households with employed persons	229.49	255.59	243.00	243.35	223.25	233.16	217.71	237.65
Extra-territorial organizations and bodies	0.86	1.01	1.92	1.48	1.67	2.00	1.25	2.29
Unknown	49.66	17.72	28.49	47.93	65.50	60.26	38.77	24.97
Service sector	**13,053.71**	**14,615.49**	**15,568.39**	**15,995.73**	**15,953.31**	**16,261.15**	**16,806.30**	**17,588.68**
Private service sector	**12,017.42**	**13,661.50**	**14,574.41**	**14,885.95**	**14,797.30**	**15,010.19**	**15,507.00**	**16,239.99**
Agriculture sector labor share (%)	43.69	41.02	39.26	38.62	39.71	39.47	39.71	38.97
Manufacturing sector labor share (%)	14.74	15.66	15.77	15.85	15.42	15.50	14.73	14.25
Service sector labor share (%)	41.51	43.19	44.83	45.37	44.71	44.86	45.40	46.65
Private service sector labor share (%)	38.22	40.37	41.97	42.22	41.47	41.41	41.89	43.07

Source: National Economic and Social Development Board.

Figure 2: Wage by Sector
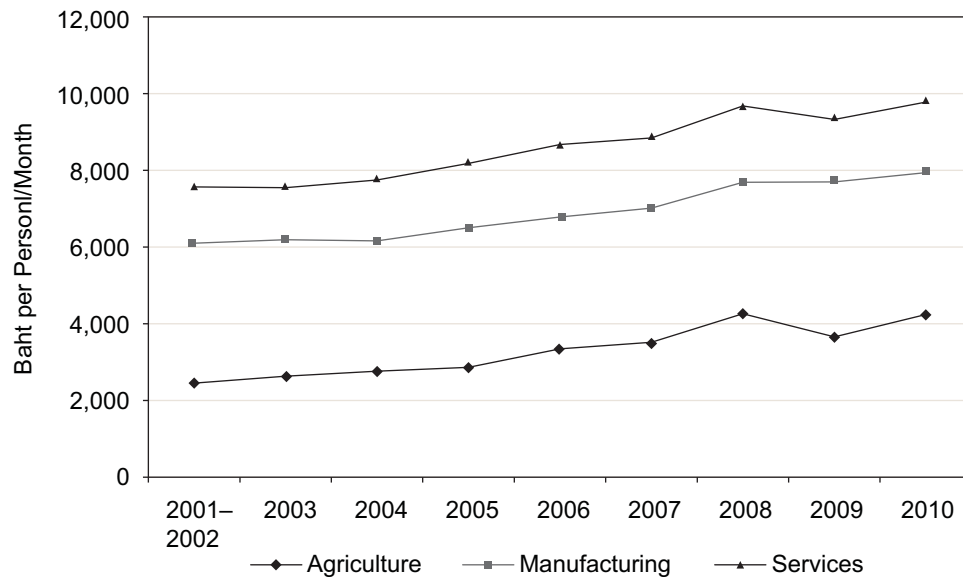
Source: National Economic and Social Development Board and author's calculations.Figures 2 and 3

Figure 3: Share of Service Industries in Total Sector Value-Added
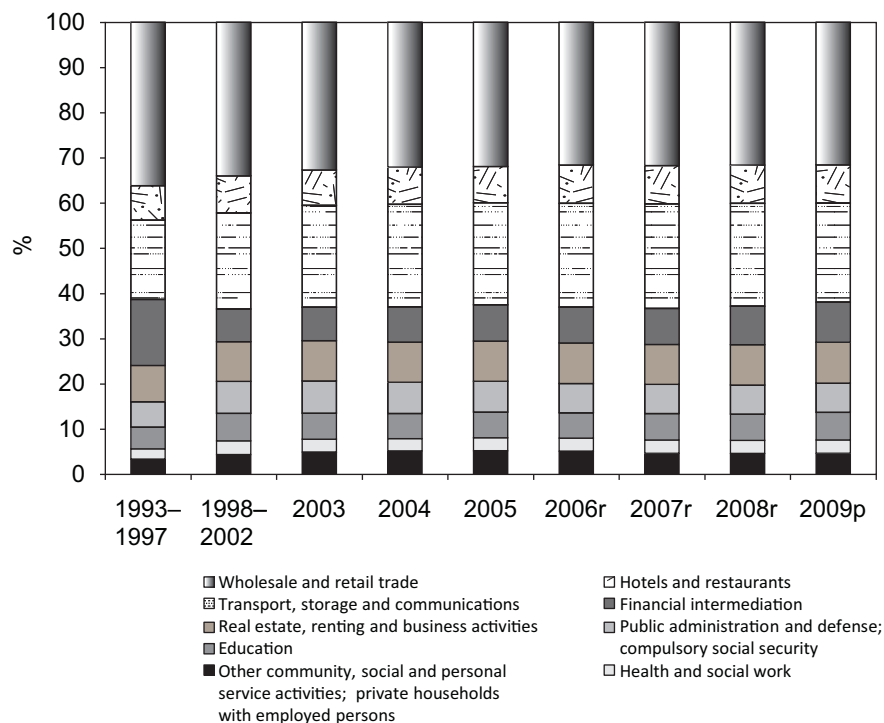
Note: p = prediction, r = re-estimate.

Source: Author's calculations using National Economic and Social Development Board data.

The service sector has become increasingly important to Thailand because of its economic contribution and the employment it provides, but the inverse relation between its contribution to GDP and its contribution to employment merits a closer look from researchers and policymakers. Based on the information in Figure 1 and the *World Factbook*, starting in 2009 we can observe a turning point where the shares of the manufacturing sector decrease and those of the service sector increase.

C.   Trade and Investment

From 2005 to 2010, Thailand had a trade deficit in services averaging about $8.9 billion that grew to almost $10 billion in 2011 (Table 5). In addition to transportation, royalties and licensing, communication services, and insurance services have caused the majority of the deficit while travel services have been the major positive component since 2005. It is noteworthy that in 2010, the hotel and restaurant industry ranked second in employment in part due to the tourism industry. According to the Thomas White International website, in 2007, tourism and travel in Thailand contributed a staggering 6% of total GDP, more than in any other Asian nation. This concurs with data from the World Trade Organization (WTO) Service Profiles that show that in 2010 Thailand received a positive net trade balance of payments in travel equal to $14.644 million which ranked it first among the Asian countries studied. Moreover, Bangkok, has received "The World's Best City Award" for four consecutive years (2010–2013) in *Travel & Leisure.*

Thailand's inward foreign direct investment (FDI) in the service sector from 2005 to 2011 averaged $3 billion with a peak in 2007 of about $3.8 billion. The majority was in financial intermediation and real estate at about 88% of gross annual FDI (Table 6). Thailand's sector has shown significant openness to trade in services by welcoming foreign investment.

III. SHARE OF OUTPUT MODEL

Based on the framework in Eichengreen and Gupta (2009), the relationship between the share of output in the service sector and per capita income in Thailand was examined using provincial data for the first time. Data for this study came from the National Economic and Social Development Board's gross regional and provincial product (GPP). Provincial data are from 76 provinces and include 16 economic activities classified under the International Standard Industrial Classification Revision 3 and are available from 1995 to 2009. Table 7 presents these descriptive statistics.

Table 5: Net Service Trade ($ million)

	2005	2006	2007	2008	2009	2010	2011
Net service trade	−6,862.95	−8,011.54	−7,937.09	−12,891.87	−6,377.33	−1,0551.10	−9,952.53
Transportation	−9,812.65	−10,771.38	−11,692.15	−15,690.66	−11315	−16,500.13	−20,844.34
Freight	−11,133.98	−11,884.91	−13,054.72	−17,131.15	−12,930.75	−17,745.62	−21,667.07
Passenger	1,410.09	1,646.65	2,211.38	2,642.95	2440.10	2163.80	2,145.01
Others	−88.76	−533.13	−848.81	−1,202.47	−824.34	−918.31	−1,322.28
Travel	5,772.92	8,801.45	11,524.99	13,160.97	11,626.72	14,597.78	21,143.24
Government services n.i.e.	5.69	11.91	−19.63	97.26	48.84	−15.04	121.20
Other services	−4,246.50	−7,633.03	−9,380.39	−12,579.06	−8,413.40	−10,819.98	−1,2974.30
Communication services	−1,380.31	−1,519.23	−1,591.21	−1,955.20	−1,583.72	−2,078.81	−2,522.53
Construction services	−58.54	−245.04	−123.35	−173.35	−310.70	−239.19	136.20
Royalties and licenses	−1,659.40	−2,000.40	−2,234.51	−2,466.32	−2,102.38	−2,927.37	−2,943.93
Insurance services	−1,380.31	−1,519.23	−1,591.21	−1,955.20	−1,583.72	−2,078.81	−2,522.53
Others	232.06	−2,349.13	−3,840.11	−6,028.99	−2,832.88	−3,495.80	−5,121.51

Note: Government services n.i.e (not included elsewhere) is a residual category covering government service transactions for goods and services (office supplies, furnishings, utilities, official vehicles and their operation and maintenance, and official entertainment) by embassies, consulates, military units and defense agencies, and personal expenditures incurred by diplomats, consular and military staff and their dependents in the economies in which they are located. Also included are transactions associated with general administrative expenditures and not included elsewhere.

Source: Bank of Thailand.

Table 6: Foreign Direct Investment by Economic Activity in Thailand, 2005–2011 ($ million)

		2005	2006	2007	2008	2009	2010p	2011p
Electricity, gas, and water supply	Inward	−87.71	353.83	33.20	200.43	221.92	−107.43	93.59
	Outward	66.06	−106.82	4.17	−289.33	−68.91	−138.39	−112.59
Construction	Inward	29.56	−93.79	29.96	−34.04	1.43	20.73	28.07
	Outward	4.39	−29.98	−72.84	−44.20	−36.23	101.79	−203.41
Wholesale and retail trade; repair of motor vehicles, motorcycles, and personal and household goods	Inward	260.27	845.21	−262.52	131.58	344.86	29.95	−512.93
	Outward	229.57	133.13	−162.29	−936.55	24.56	−446.71	−983.42
Hotels and restaurants	Inward	155.05	80.53	−43.31	450.25	118.42	−190.44	94.56
	Outward	−89.32	4.96	−127.98	−96.68	−169.47	−166.51	−10.42
Transport, storage, and communications	Inward	−29.94	124.97	166.77	−51.34	46.00	−31.99	12.83
	Outward	−9.96	−14.68	57.08	−60.42	51.10	18.59	−93.63
Financial intermediation	Inward	3,269.45	691.65	2,815.04	1,765.99	274.15	2,332.01	1,662.11
	Outward	−231.93	−154.06	−2,337.52	−1,790.53	−1,755.14	−466.34	−3,368.91
Real estate, renting, and business activities	Inward	73.28	1,419.06	1,103.16	1,202.53	767.96	802.40	905.14
	Outward	−7.50	−14.75	−272.90	335.77	−51.24	−96.49	−723.96
Gross foreign direct investment	Inward	3,669.96	3,421.46	3,842.30	3,665.40	1,774.74	2,855.23	2,283.37
	Outward	−38.69	−182.20	−2,912.28	−2,881.94	−2,005.33	−1,194.06	−5,496.34

p = prediction.

Source: Bank of Thailand.

Table 7: Descriptive Statistics

| Variable	No. of Observations	Mean	Std. Dev.	Min	Max
Agriculture (million baht)	1,140	4,433.20	3,052.46	385	18,917
Non-agriculture (million baht)	1,140	41,292.96	117,045.70	2,653.	1,074,500
Manufacturing (million baht)	1,140	16,918.32	42,069.44	92	260,337
Services (million baht)	1,140	23,410.76	85,680.50	2,439	84,9739
GPP total (million baht)	1,140	45,637.11	116,885.50	3,383	1,075,643
Population (1,000 persons)	1,140	833.29	810.73	145	6,866
Per capita income at 1988 prices (baht)	1,140	48,194.58	59,846.07	9,137	413,657
Service share (%)	1,140	55.49	16.34	11	89
Agriculture share (%)	1,140	22.19	13.01	0.10	58.97
Manufacturing share (%)	1,140	20.12	21.33	2.46	86.97
Non-agriculture share (%)	1,140	77.80	13.01	41.03	99.89
Log per capita income	1,140	10.38	0.79	9.12	12.93

GPP = gross provincial product

Source: Author's calculations using data from National Economic and Social Development Board.

Scatter plots[4] are used to compare the share of services in GPP and the log of per capita income. The plots are shown in Figure 4 in four categories. Plot (1) displays all provinces except Bangkok and vicinity and Phuket. The relationship appears wave-like with an increasing trend in the service share when income is low and a decreasing trend when income is high. This relationship differs from a major assumption in economic development: the service sector grows as income increases. Plot (2) shows Bangkok and vicinity and presents a parabolic function. Plot (3) is for Phuket, Thailand's largest island, and confirms the conventional assumption that service output and income are directly related. Although Phuket and Bangkok seem to be outliers in our model, by including these outliers plot (4) still maintains a wave-like shape. Therefore the panel data model uses 76 provinces from 1995 to 2009 with a total of 1,140 observations and hypothesizes the wave-like shape as shown in Figure 4 plot (4). Because of the limitations of a bounded share as discussed in Eichengreen and Gupta, the relationships were estimated in quartic form.

Before determining the equation for the estimation, the relationships between the shares of GPP and per capita income in each of the three sectors were tested using the Lowess plots as stated in Eichengreen and Gupta. The agricultural share of output declines as income increases while the manufacturing share of output rises as income increases. The service share of output generally decreases as income increases except for the lowest and the highest income groups. This information is relevant to the fact stated in Figure 1. The Lowess plots for the manufacturing share of GPP are similar to the plots from Eichengreen and Gupta, but the declining trend has not yet appeared.

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[4]   The plots presented in Figure 4 are uncontrolled for time and spatial dimensions; nevertheless, they help explain the nature of the data used in the model.

**Figure 4: Scatter Plot of the Service Share of Gross Provincial Product
and Log per capita Income**
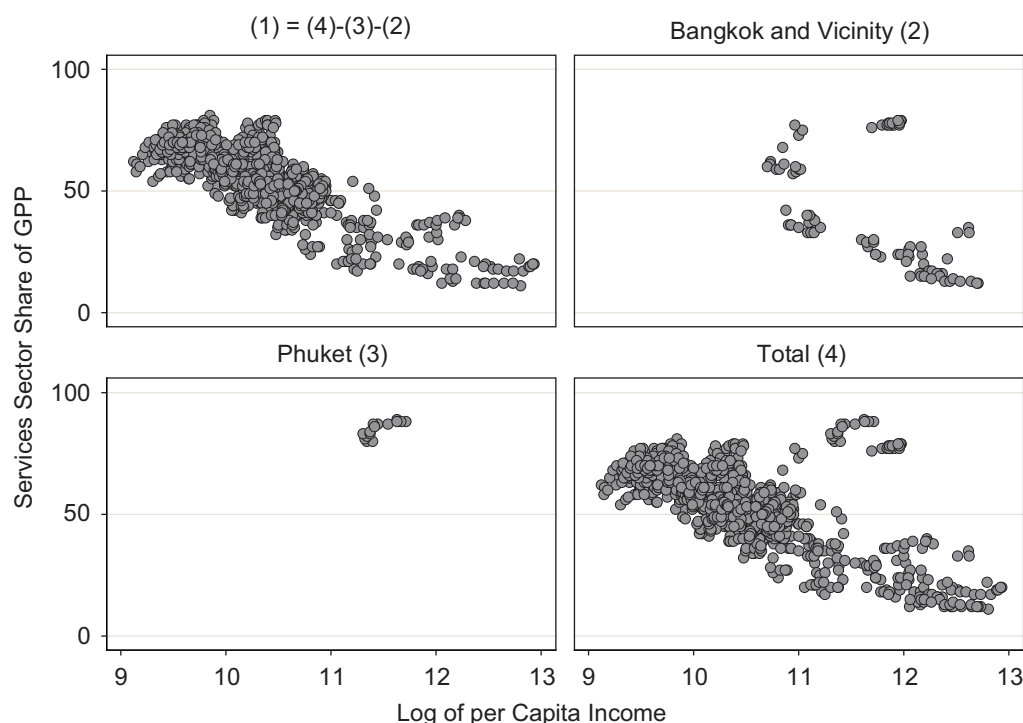
GPP = gross provincial product.

Note: There are no controls for any time or spatial dimensions.

Source: Author's calculations using National Economic and Social Development Board data.

The fixed-effect model with robust standard errors was run with the service sector's percentage of GPP as the dependent variable. The independent variables were the four powers of the natural log of real per capita income and a dummy variable for structural change in the Thai economy. The dummy variable may be seen as post-financial crisis development factors. Fixed-effect models control for the effects of time-invariant variables with time-invariant effects, i.e., the variable has the same effect across time such as gender, race, and some institutional factors. Therefore, the equation was determined as follows:

$$serviceshare_{it} = Constant + \sum_{i} \theta_i D_i + \alpha_1 Y_{it} + \alpha_2 Y_{it}^2 + \alpha_3 Y_{it}^3 + \alpha_4 Y_{it}^4 + \varepsilon_{it}$$

The estimates are displayed in Table 8. All models confirm the hypothesis of a quartic functional form and two waves of service sector growth.

The service sector share in GPP and per capita income in model I (base case) and the relationship between the service sector share in GPP and per capita income in model II (with a dummy variable) were then plotted together in Figure 5. This figure exhibits two types of relationships based on estimates from both models. Each relationship pattern indicates that there is a possibility for two waves of service sector growth in Thailand and also implies that the service sector is a growth engine for the Thai economy. This finding is relevant to previous

studies using GDP data[5] that described two waves of service sector growth: the study by Eichengreen and Gupta (2009) and the study by Park and Shin (2012).

Table 8: Coefficient Estimates for the Relationship between Service Share of Gross Provincial Product and Per Capita Income

	Model I	Model II
Log per capita income	6,520.90**	6,255.68**
	(2,846.99)	(2,952.33)
Log per capita income, squared	−857.13**	−817.42**
	(388.75)	(403.47)
Log per capita income, cube	49.63**	47.07*
	(23.47)	(24.38)
Log per capita income, quartic	−1.07**	−1.01*
	(0.53)	(0.55)
Dummy for 2001		−2.57***
		(0.43)
Constant	−18,370.25**	−17,734.84**
	(7,777.60)	(8,059.30)
Province fixed effects	yes	yes
Observations	1,140	1,140
Number of provinces	76	76
Prob > F	0.0004	0.0000
R-squared	0.49	0.46

Note: Robust t statistics are in parentheses. *, **, *** indicate coefficient with significance at 10%, 5%, and 1%, respectively.

Source: Author's calculations.

Figure 5: Service Share of Gross Provincial Product and Log per capita Income Based on Quartic Functional Form
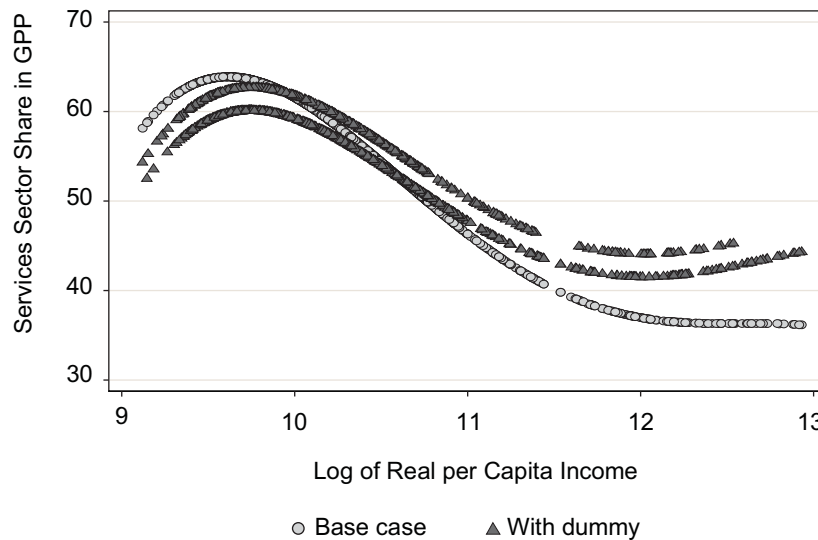
GPP = gross provincial product.

Source: Author's calculations using National Economic and Social Development Board data.

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[5]   Using GDP data, Eichengreen and Gupta (2009) and Park and Shin (2012) assume no resources move between countries. This study assumes no resources move between provinces. In the real world, there is labor/human capital movement not only within a country but also among countries.

The first wave takes place when a province moves from lower to middle-income status, and the second takes place when a province moves from middle to high-income status. Therefore there will be two turning points. Figure 5 displays information that is especially important for Thailand.

- After a first turning point, provinces will experience a reduced service share in GPP as incomes move toward higher levels. Moreover, per capita income in the bottom 10% is log per capita income less than 9.516 which is equal to per capita income of B13,577 a year (1988 prices). All of the lower per capita income provinces are located in the northeastern region.[6]
- The high-income provinces have two distinct relationship patterns that could explain why the service sector is a growth engine.
- The first possible turning point for the estimates in model II occurs when per capita income in the highest 8% of the population is equal to the log per capita of income greater than 12 and equals per capita income of B163,169 a year (1988 prices). There are only seven provinces[7] with these characteristics. They contain industrial parks and are either near the capital or a marine port. In this model, the service sector would be a growth engine for the Thai economy.
- For the base case, our estimates show the possible turning point would be a point after log per capita income greater than 13, or per capita income greater than B442,000 per year (1988 prices). In the base case, the Thai economy would depend mainly upon the manufacturing sector rather than services for growth.

IV. TOWARD A POSSIBLE TURNING POINT

A.   Share of Output Model Revisited

Thailand's service sector could potentially experience a second wave of growth, particularly in high-income provinces near Bangkok. In this section, specific service activities are investigated in order to offer public policy advice. The service sector is then assessed comparing model II with the dependent variables of private service sector results and 12 other service activities. Before doing so, data on 12 service activities were tested in scatter plots to reveal the relationship between the share of the GPP and log per capita income. The plots indicated that each service activity may not be evidence for a quartic function and also has several outlying points. Therefore, estimating the share of each service in GPP using the model discussed above is not statistically significant except for wholesale and retail trade, construction, and education.

The relationship between the private service sector share and log per capita income is almost the same as the relationship seen in Figure 5 including a possible turning point for the service sector share in GPP at high per capita income levels. This confirms that government services such as public administration, defense, and compulsory social security play a lesser role in per capita income. Based on the scatter plots, the share of government services in GPP has a negative relationship with the log of per capita income. Construction and related engineering services and wholesale and retail trade have a positive relationship between the

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[6] The lowest per capita incomes are in Amnatcharoen, Buriram, Chaiyaphum, Kalasin, Mahasarakham, Mukdahan, Nakhonphanom, Nongbualamphu, Roi-et, Sakonnakhon, Sisaket, Surin, and Yasothon.

[7] Those are Chachoengsao, Chonburi, and Rayong in the eastern region; Pathumthani, Samutsakhon, Samutprakan in the Bangkok metropolitan area; and Phranakhonsriayuthaya in the central region.

share of output and per capita income, while education services have a negative relationship (Figure 6).

Figure 6: Share of Gross Provincial Product and Per Capita Income in Construction, Trade, and Education
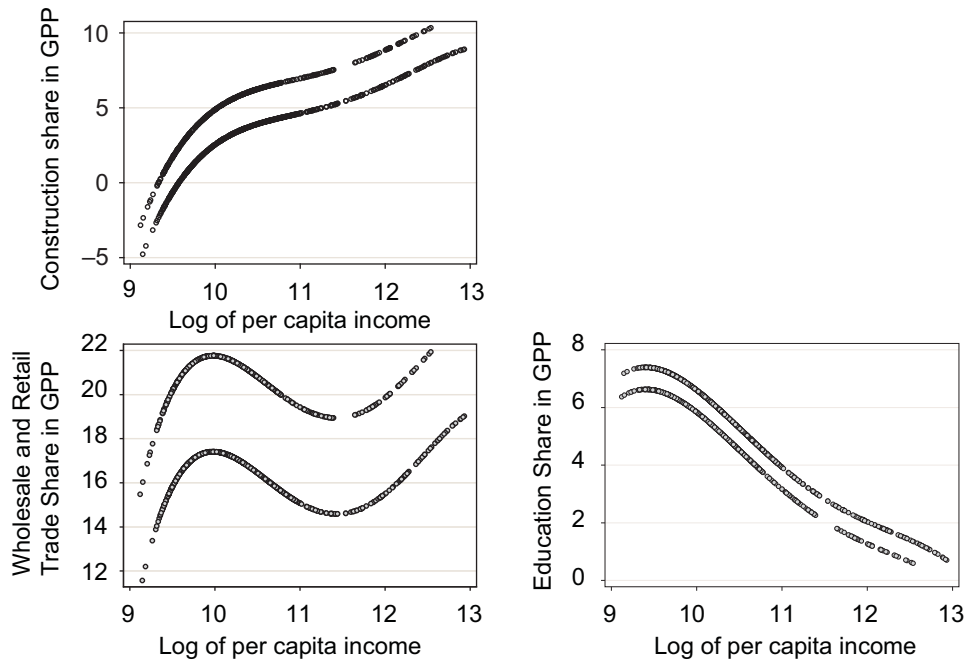
GPP = gross provincial product.

Source: Author's calculations using National Economic and Social Development Board data.

Eichengreen and Gupta found that wholesale and retail trade has a negative relationship with income while our estimates found the opposite. Wholesale and retail trade in Thailand is around 10%–20% of GPP which indicates two waves of growth, but including street vendors and flea market merchants from the informal economy would make the data more complete. The relationship between construction and income is linked to the stability of Thailand's real estate and infrastructure. The plots indicate that returns from construction must increase in order for income to increase in each middle-income province. From the estimates, wholesale and retail trade and construction are clearly the two waves of service sector growth that imply a growth engine for the Thai economy.

The relationship between the share in GPP and per capita income for education services predicted by the model is downward sloping. This is completely different from the Group II plots in Eichengreen and Gupta. It should be noted that the average annual expenditure on education is about B1.2 billion (1988 prices) per province or B1,376 (1988 prices) per person. When the average GPP grows faster than the rate of growth in expenditures, the share in GPP will decrease, i.e., it will have a negative relationship with per capita income. Educational expenditures may be under-estimated, especially for special education services or offsite tutoring. Agencies involved with education should investigate why this relationship is a converse one when in most developed countries the relationship is positive.

B. Total Factor Productivity

Although plots for the relationship between the service sector and per capita income indicate the possibility for service sector growth, the components of its growth can be determined by total factor productivity (TFP). The latest TFP study for Thailand was done in 2009 by the National Economic and Social Development Board. It calculated the TFP for eight economic activities: agriculture, mining, manufacturing, electricity, construction, retail trade, transportation, and services and other activities (NESDB 2009). Among these services, transportation was the most significant with a positive TFP between 1982 and 2007 except during the 1997 financial crisis. This may be due to the country's improvement in logistics, mainly in road, air, and sea transportation. The TFP for retail trade is positive after 1999 while for services and other activities it is positive after 2002 (Table 9).

It is probable that income from retail trade is more than its recorded high as income from the informal economy is not recorded. Although TFP indices have been positive in services and in other activities since 2002, the reason is still unclear because the activities have been cumulated. It indicates only a reason for growth; if it continues, we may expect a real turning point in service sector growth. In terms of TFP, retail trade and transportation should be major service activities for Thai economic growth.

C. Revealed Comparative Advantage

Although trade in services and FDI implies high levels of openness in Thailand's service sector, it does not imply anything about competitiveness. If countries have information about their competitiveness in trade and investment, they can better implement trade policies and negotiate suitable agreements. Using the revealed comparative advantage (RCA) index[8] established by Balassa (1965), important service activities in Thailand were examined. If the RCA for a service is greater than 1, it means that country has a level of competitiveness above the world average and a comparative advantage in that service. The opposite is true for an RCA less than 1. If any services in Thailand have a comparative advantage, Thailand will gain from trade in those services, and they could be a growth engine for the Thai economy.

RCAs were calculated for selected economies using the WTO International Trade Statistics on commercial services including transportation, tourism and travel, and other services such as business services. Table 10 presents the RCAs for these services from 1990 to 2009.

In transportation among selected Association of Southeast Asian Nation (ASEAN) members, only Singapore consistently maintained a comparative advantage throughout the decade. This is related to the fact that the country has been a hub for both sea and air transportation. Hong Kong, China; Japan; and the Republic of Korea also maintained comparative advantages in transportation.

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8   RCAs were estimated using the following steps. (i) Divide the value of the service exports under consideration by the value of total exports for the country. (ii) Calculate the portion of the total value of those service exports in the world divided by the value of total exports in the world. (iii) Divide (i) by (ii).

Table 9: Total Factor Productivity in Construction, Retail Trade, Transportation, and Services and Other Activities

Period	Construction				Retail Trade			
	GDP	Labor	Capital	TFP	GDP	Labor	Capital	TFP
1982–1986	6.2	3.0	4.1	−0.9	3.2	0.6	3.1	−0.5
1987–1991	17.3	8.8	10.3	−1.8	12.0	0.8	9.1	2.1
1992–1996	8.3	4.6	12.6	−8.9	6.7	0.8	9.4	−3.4
1997–1998	−31.9	−8.2	−1.8	−21.9	−8.1	0.0	0.2	−8.4
1999–2001	−5.3	1.2	0.9	−7.4	2.0	0.3	−0.6	2.3
2002–2006	5.1	2.7	1.9	0.5	3.6	0.5	1.2	2.0
2007	2.0	0.0	2.7	−0.5	3.2	2.1	2.1	0.9
Average 1982–2007	4.1	3.2	5.6	−4.7	4.7	0.4	4.4	−0.3
Period	Transportation				Services and Other Activities			
	GDP	Labor	Capital	TFP	GDP	Labor	Capital	TFP
1982–1986	8.9	2.2	2.8	3.9	6.1	8.9	2.4	−5.2
1987–1991	11.4	1.8	6.8	2.8	8.2	3.8	3.3	1.1
1992–1996	11.1	0.8	10.1	0.3	4.4	1.1	4.9	−1.6
1997–1998	−2.2	−0.3	4.4	−6.3	−5.2	1.5	1.3	−8.0
1999–2001	6.8	0.5	1.7	4.6	−0.8	4.5	0.0	−5.4
2002–2006	5.6	0.2	2.2	3.3	5.9	1.1	0.6	4.2
2007	6.0	−0.3	2.6	3.8	4.0	2.2	0.9	0.9
Average 1982–2007	8.0	0.1	4.9	2.2	4.4	5.1	2.3	−3.0

Note: GDP = gross domestic product, TFP= total factor productivity.

Source: Author's calculations.

Table 10: Revealed Comparative Advantages in Services in Selected Economies, 1990–2009

Economy	Transportation				Tourism and Travel Related				Other Services			
	1990	2000	2005	2009	1990	2000	2005	2009	1990	2000	2005	2009
ASEAN												
Brunei Darussalam	-	0.00	2.19	-	-	0.00	1.12	-	-	0.00	0.37	-
Cambodia	-	0.72	0.51	-	-	2.25	2.85	-	-	0.25	0.19	-
Indonesia	0.10	0.00	0.97	-	2.55	3.08	1.30	-	0.28	0.04	0.84	-
Lao PDR	2.61	0.56	0.67	-	0.72	2.38	2.65	-	0.02	0.25	0.22	-
Malaysia	1.11	0.86	0.90	-	1.32	1.14	1.64	-	0.63	0.97	0.69	-
Myanmar	0.36	0.71	2.17	-	0.62	1.11	2.03	-	1.84	1.08	0.43	-
Philippines	0.30	0.59	0.92	-	0.47	2.00	1.81	-	2.01	0.50	0.58	-
Singapore	0.61	1.77	1.54	1.59	1.08	0.57	0.42	0.48	1.23	0.90	1.07	1.02
Thailand	0.74	1.00	1.00	0.90	2.03	1.70	1.73	1.96	0.27	0.50	0.59	0.57
Other Asian Economies												
PRC	1.65	0.52	0.90	-	0.89	1.69	1.43	-	0.61	0.76	0.80	-
Hong Kong, China	1.35	1.35	1.37	1.37	0.87	0.46	0.58	0.74	0.86	1.20	1.06	0.98
Rep. of Korea	1.21	1.96	2.35	2.37	1.02	0.72	0.48	0.61	0.82	0.70	0.65	0.64
India	0.73	0.53	0.47	-	1.00	0.68	0.52	-	1.21	1.48	1.52	-
Taipei,China	1.17	0.88	1.00	0.83	0.74	0.59	0.70	0.87	1.10	1.36	1.17	1.13
Developed Economies												
Australia	1.24	0.95	0.87	0.62	1.27	1.50	2.00	2.41	-	-	-	-
Canada	0.80	0.82	0.77	0.76	1.02	0.86	0.91	0.94	1.10	1.20	1.10	1.10
EU-27	0.00	0.98	0.96	0.99	-	0.96	0.91	0.87	-	1.00	1.00	1.00
Japan	1.50	1.57	1.51	1.19	0.26	0.20	0.23	0.32	1.29	1.27	1.19	1.25
New Zealand	1.52	1.19	0.85	0.00	1.26	1.63	2.19	–	0.30	0.40	0.40	–
Russian Federation	–	1.58	1.59	–	–	1.12	0.86	–	–	0.61	0.80	–
United States	0.98	0.77	0.74	0.72	1.12	1.10	1.02	0.95	0.90	1.00	1.10	1.10

Note: "–" means data not available; ASEAN = Association of Southeast Asian Nations; EU-27 = European Union, comprising Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, United Kingdom; Lao PDR=Lao People's Democratic Republic; PRC=People's Republic of China.

Source: Author's calculations using data from the World Trade Organization International Trade Statistics.

In contrast, the ASEAN countries had comparative advantages in tourism and travel-related services except for Singapore. Australia, New Zealand, and the United States (US) also had comparative advantages in travel while in the East Asian economies, only the People's Republic of China did. As expected, Canada, the European Union, and the US had comparative advantages in other services since they generate significant income from intellectual property. Hong Kong, China; India; Singapore; and Taipei,China also had comparative advantages in these industries while other Asian countries including Thailand had comparative disadvantages. Hoekman and Mattoo (2008) noted that India has shifted from "low-end, back-office services" such as data management, to "high-end services" like customer relations, human resource management, and product development and hypothesized that large numbers of educated people support the country's development.

The competitiveness of Thailand's service sector therefore depends mainly on tourism and travel as the RCA was greater than 1 throughout the decade. For transportation, although Thailand's Suvannabhumi International Airport opened in 2006, the RCA decreased slightly which is related to the fact that Thailand's marine transportation still needs attention. In addition, strategic action plans for logistics are also required

D. Policy Recommendations

This research demonstrates that the service sector is a growth engine for the Thai economy. The possible turning point is shown in Figure 5. The following are policy recommendations for service activities with positive TFP indicators or an RCA greater than 1, namely construction, wholesale and retail trade, transportation, and tourism and travel.

An unambiguous, politically independent, national development plan. Figure 1 and Figure 5 indicate that the service sector is undergoing a structural transition. After the 1997 financial crisis, the significance of manufacturing in GDP increased while the service sector has been in transition. Before 2009, there was no national strategic plan for Thailand's service sector, and the politics of the current (Yingluck) government have made implementing the plan (developed after 2009) difficult. Increasing the minimum wage to B300 a day (about 40%) wiped out several labor-intensive small and medium-sized enterprises. In addition, the current government does not pay much attention to the concept of a creative economy that concentrates on service sector development because that concept was initiated by the former government. Thailand needs an unambiguous, politically independent national plan for the service sector that is sensibly crafted and amenable to economic and social changes like population aging and the country's role in the Asian Economic Community (AEC). In addition, the national policy should incorporate objectives for decreasing the deficit in service trade and for attracting FDI in infrastructure.

As shown in Table 5, tourism and travel-related activities are the only ones that generate a surplus in service trade. As stated in the report by the Thailand Development Research Institute Foundation (2009), many service activities have increased their deficits over the past 15 years, for example, royalties and licensing fees, freight, and other transportation. This indicates the reliance of the Thai industrial structure on external technology. To reduce the deficits, knowledge and innovation must be upgraded. Also, as shown in Table 6, Thailand needs more FDI in infrastructure such as electricity, water, telecommunications, and transportation. These investments will generate complementary economic growth throughout the country.

Revised data collection methods. As discussed, Thailand has several definitions for the service sector, and agencies collect data for different purposes, which creates complexities. Thailand should start revising its system of data collection in as much detail as possible to make service data and classification methods comparable to those of other countries. The revised system should gather data horizontally and vertically and include regional and provincial data. Informal service activities such as street vending, driving taxis, and offsite tutoring should be collected and included in estimates.

Areas and services with potential. The scatter plots of the relationship between the service sector share in GPP and log per capita income by region show decreasing trends in the north, northeast, and center which indicates that there is no single policy for developing the sector (Figure 7a). Regions in which service activity should potentially be stimulated are provinces around Bangkok, those in the east, and those in the south. A closer look at selected provinces confirms that boosting service activities in Bangkok and Phuket should be a priority over supporting those in Chiang Mai (Figure 7b).

Figure 7a: Scatter Plot of the Service Share of Gross Provincial Product and Log per capita Income
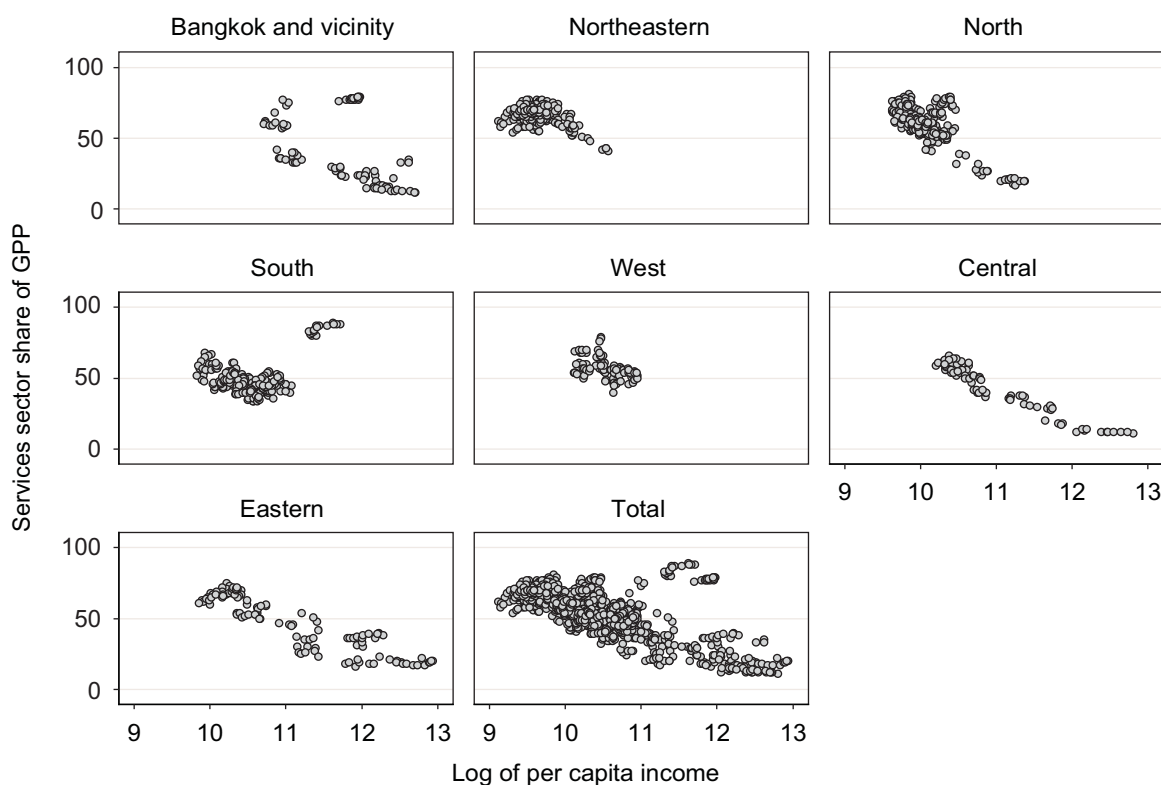
GPP = gross provincial product.

Source: Author's calculations using National Economic and Social Development Board data.

Figure 7b: Scatter Plot for Selected Provinces
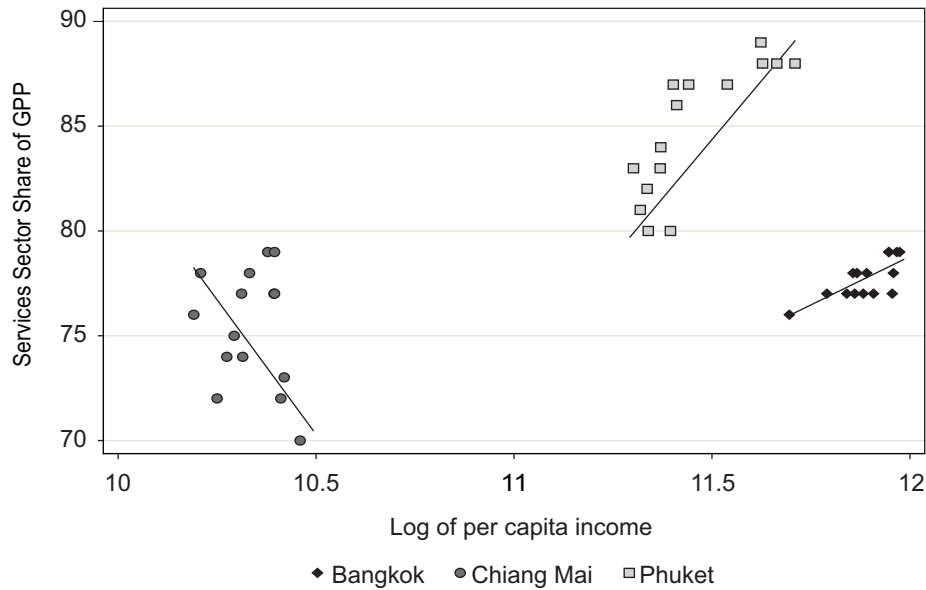
GPP = gross provincial product.

Source: Author's calculations using National Economic and Social Development Board data.

This research shows that construction, wholesale and retail trade, transportation, and tourism and travel-related activities should be gradually promoted in both public and private agencies to advance economic growth. For wholesale and retail trade, the data indicate that there are both formal and informal sectors. Despite studying only the formal sector, it was evident that wholesale and retail trade is a growth engine and that Thailand should continue to support it to reduce transaction costs from producers to consumers. Since wholesale and retail trade in Thailand is labor-intensive, the country should prepare for the AEC labor movement and its impacts. Transportation and construction support other economic activities, so decreasing the cost of these services could benefit the country as a whole. The government should make it a policy to upgrade these services.

The RCA index confirmed the importance of tourism and travel in the Thai economy in terms of generating income and jobs. Agencies should continue to promote different aspects of tourism such as medical, long-stay, and cultural tourism and should develop information support and systems for tourists. Thailand should consider revising its tourism industry especially with a view to sustainable development. The government should study how to optimize the types of tourists and the income they generate rather than simply maximizing their numbers.

V. CONCLUDING REMARKS

The service sector is important in the Thai economy as it accounts for about half of the national GDP and employs more than 40% of the labor force. Among services, wholesale and retail trade, transportation, and tourism and travel-related activities are the largest contributors to GDP and maintain significant shares in employment. A major problem with Thailand's service sector is the classification method used as most data from agencies are still in ISIC revision 3 or in a format that can be used for only routine reports, not for research. Even though two major

Thai agencies—the National Economic and Social Development Board and the Bank of Thailand—released relevant data in April 2012 using ISIC revision 4, the data covers only 1 year or present the new set of GDP with chain value measures. This study suggests revising the data collection format taking into account Thailand's strategies for high economic growth and high volume in international trade.

The Thailand Development Research Institute Foundation (2009) reported that labor productivity in the sector is low possibly because the sector is very labor intensive. This study examined the relationship between the service sector share of GPP and per capita income in order to determine a possible turning point. Estimates from the study indicate that there are two waves: lower-income provinces use services as a growth engine, but middle-income provinces do not. Higher-income provinces (specifically the seven highest) have shown the potential for a possible turning point in which the service sector could function as a growth engine. As growth in services comes from growth in both the private and the public sectors, the government should support the private sector with unambiguous policies suitable for each region and province. Based on this study, Thailand should continue to promote wholesale and retail trade, tourism and travel-related activities, transportation, and construction. These activities demonstrate one or more of the following: two clear waves in their share in GPP (wholesale and retail trade and construction); positive TFP indices (retail trade and transportation); and an RCA greater than 1 (tourism and travel-related activities). Because of comparative disadvantages in other services, especially royalties and licensing, communication, and insurance, Thailand needs to upgrade its industrial and service structures. Education services need special attention because of their declining trend in the share of services compared with the situation in developed countries. '

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A Turning Point for the Service Sector in Thailand
This paper tests the hypothesis that the service sector is a growth engine in the Thai economy. While many developed countries maintain a positive association between the shares of the sector in output and per capita income, the opposite is true in Thailand. Using estimates from a fixed-effects model, the study confirms two waves of growth. In addition, total factor productivity and revealed comparative advantages are also discussed to determine the significant role of services and some service activities.